



QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

Edited by

Armelia Sari Widyarman, Muhammad Ihsan Rizal,
Moehammad Orliando Roeslan & Carolina Damayanti Marpaung



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QUALITY IMPROVEMENT IN DENTAL AND MEDICAL KNOWLEDGE, RESEARCH, SKILLS AND ETHICS FACING GLOBAL CHALLENGES

The proceedings of FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) include selected full papers that have been peer-reviewed and satisfy the conference's criteria. All studies on health, ethics, and social issues in the field of dentistry and medicine have been presented at the conference alongside clinical and technical presentations. The twelve primary themes that make up its framework include the following: behavioral epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics. This proceeding will be beneficial in keeping dental and medical professionals apprised of the most recent scientific developments.



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Quality Improvement in Dental and Medical Knowledge, Research, Skills and Ethics Facing Global Challenges

Edited by

Armelia Sari Widyarman, Muhammad Ihsan Rizal,
Moehammad Orliando Roeslan and Carolina
Damayanti Marpaung
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Preface

Faculty of Dentistry Universitas Trisakti (Usakti) presents FORIL XIII 2022 Scientific Forum Usakti conjunction with International Conference on Technology of Dental and Medical Sciences (ICTDMS) on December 8th–10th 2022. The theme of the conference is “Quality Improvement in Dental and Medical Knowledge, Research, Skills and Ethics Facing Global Challenges”.

The triennial conference has served as a meeting place for technical and clinical studies on health, ethical, and social issues in field medical and dentistry. It is organized around 12 major themes, including behavioral, epidemiologic, and health services, conservative dentistry, dental materials, dento-maxillofacial radiology, medical sciences and technology, oral and maxillofacial surgery, oral biology, oral medicine and pathology, orthodontics, pediatrics dentistry, periodontology, and prosthodontics.

The most recent findings in fundamental and clinical sciences related to medical and dental research will be presented in the conference that will be published as part of the conference proceeding. This proceeding will be useful for keeping dental and medical professionals up to date on the latest scientific developments.

Dr. Aryadi Subrata
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Analyzing teledentistry consultation during the pandemic Covid-19: A challenge of images in online consultation

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ABSTRACT: During covid-19 pandemic era, teledentistry become booming without meeting the dentist directly in the dental office. The patient can get to consultation, prescription for medicine, dental check-up, early or preventive treatment, emergency treatment, diagnosis of symptom, recommendation of treatment, education, and more information dental and oral health. In this consultation, dentist needs to anamnesis and examine the clinical situation through images, since some patients cannot explain their symptom clearly. Therefore, the objective of this study is analyzing the images in teledentistry during pandemic era 2019–2022. A total of 31,946 consultations through teledentistry were analyzed descriptively. Data and images were examined and were separated in some groups i.e.: clinical intra and extra-oral photos, radiograph, medicine, dental education and non-categorized image. Results show that the peaks of consultation in the year 2020 was on April with 3532 cases. Most of the patients were 21 – 30 years old, with women at the most. 32% of patients sent images, while the rest did not send any images. 33% of the images were clinical intra oral photos that could be categorized as poor photos. It can be concluded that in Pandemic era, the biggest problem of teledentistry is inadequate quality of digital clinical intra-oral photo for the diagnosis to support the anamnesis. A comprehensive anamnesis and image analysis is very important to prevent complication of the cases, in the future and direct clinical consultation and treatment is suggested.

1 INTRODUCTION

The teledentistry is originally an online dental consultation using smartphone, or another gadget, which interaction the dentist and patient living in a rural area. However, during covid-19 pandemic era, teledentistry was booming since it is relatively easy, simple, fast, practical and low cost, without go to the dental office, besides there was decreased the number of dental practice, especially in the early months of pandemic era (Amtha *et al.* 2021; Jha *et al.* 2021; Lin *et al.* 2022; Pentapati *et al.* 2017; Soegyanto *et al.* 2002). More than 90% of the patients feel a very satisfied with that consultation, since they can communicate effectively with their dentist, without any unsecure feeling for potential contact with covid-19 and keep physical distancing (Amtha *et al.* 2021; Aquilanti *et al.* 2020; Dharsan *et al.* 2020; Haider *et al.* 2020; Jha *et al.* 2021; Lin *et al.* 2022; Maqsood *et al.* 2021; Mehta & Mittai 2021; Soegyanto *et al.* 2022; Tenore *et al.* 2021; Yandi *et al.* 2002). During teledentistry, the patient can get to consultation, prescription for medicine, dental check-up, early or preventive treatment, emergency treatment, diagnosis of symptom, recommendation of treatment, more information dental and oral health education (Dharsan *et al.* 2020; Eby *et al.*

2016; Hervina *et al.* 2021; Priambodo 2019). In this consultation, dentist needs to anamnesis and clinical examine the dental and oral health through the images (Passi *et al.* 2017). In the reality, many patients cannot explain their symptom clearly or they cannot make a good image to explain their dental and oral health condition (Modak & Basu 2020; Priambodo 2019). Actually, any kind of camera can be used to make a photograph of the dental and oral health condition (Priambodo 2019). Certainly, intra-oral camera is one of the best choices, as a photograph for teledentistry (Passi *et al.* 2017; Pentapati *et al.* 2017). These situations make the challenge of the analyzing dental and oral health's patient in teledentistry, which may impact to a false diagnosis or an inaccurate treatment planning (Kadarina 2020). Therefore, the objective of this study is analyzing the images in teledentistry during pandemic era 2019–2022.

2 METHODS

A total of 31,946 consultations through teledentistry, using a platform mobile health application, were analyzed descriptively. Data and images during the anamnesis were gathered, since the patient was asked to take some pictures using a camera for smartphone to give more information of the case. The photos were separated in some groups i.e.: clinical intra oral photos, clinical extra oral photos, radiograph, medicine, dental education and miscellaneous images.

3 RESULTS

Figure 1 represents the consultation during pandemic era, from October 2019 to June 2022.

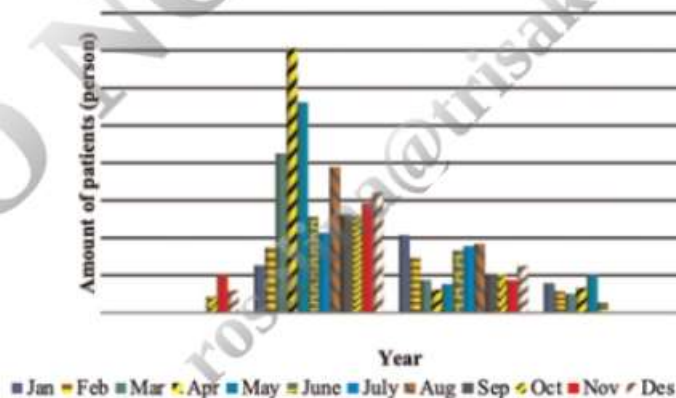


Figure 1. Total consultation during pandemic era, from October 2019 to June 2022.

The peak of consultation in the year 2020 was on April with 3532 cases, while in 2021 the peak was on January with 1035 cases and in 2022 there was 505 cases on May.

Most of the patients were 21 – 30 years old, with women at the most, and the oldest patient is 80 years old (Figure 2).

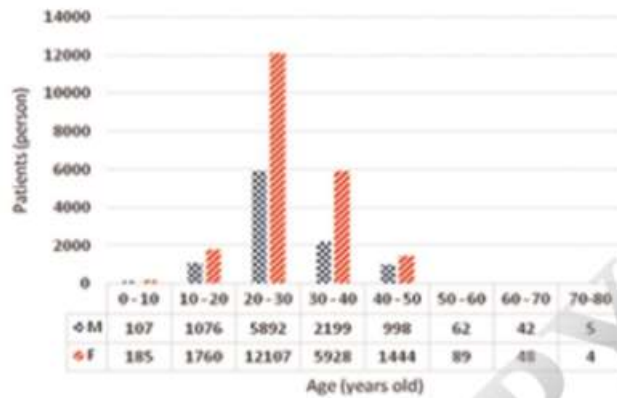


Figure 2. Distribution of man and woman patient from October 2019 to June 2022.

The images might be in the form of clinical photos, intra oral or extra oral projection; radiograph, such as a periapical, occlusal, orthopantomograph / panoramic, cephalometry; the result of X-ray analysis; medicine or prescription; any kind of education material from websites or dental e-commerce. These photos can be categorized in some groups, presented in Table 1. Clinical intra oral photos is the majority, 83.19%, categorized as good, acceptable, poor and impossible (Figure 3).

Table 1. Digital images sent during teledentistry communication.

Category of image	Criteria	Total	%
Intra oral clinical condition	Clear:	1,193	11.79
	Very good and clear image, can be easily diagnosed		
	Acceptable:	1,800	17.79
	Acceptably good image, can be diagnosed		
	Poor:	3,398	33.58
	Bad image, hard to diagnose		
Impossible:	Impossible:	2,027	20.03
	Bad image, cannot be analyzed		
	Extra oral clinical condition	386	3.81
Radiograph	Periapical	36	0.36
	Panoramic	210	2.08
	Cephalometry	12	0.12
	Occlusal	1	0.01
	X-Ray analysis	2	0.02
Medicine	Taken medicine	650	6.42
	Prescription	32	0.32
5. Dental Education	a. Promotion material / e-commerce	27	0.27
	Article from internet	35	0.35
6. Miscellaneous		382	3.78
7. Video		9	0.09
Total of the images		10,118	100%

Hence, only 32% (10,118 photos) of the patients sent photos, while the rest did not send any photo.

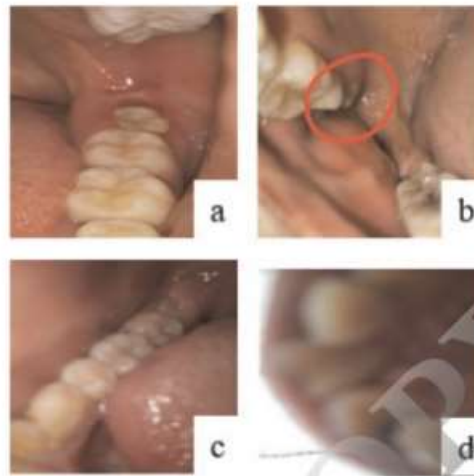


Figure 3. Categories of intra-oral photos: a. clear, b. acceptable, c. poor, d. impossible.

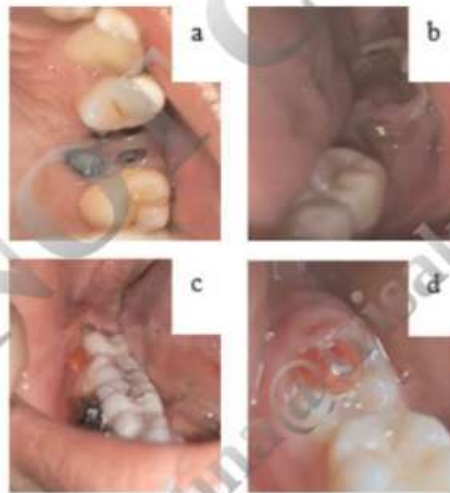


Figure 4. Different diagnosis a. gangrene radix, b. gingival polyp c. periapical abscess and pericoronitis, d. pulpal polyp.

The example of other images is presented in Figure 4. Most of intra oral clinical photos, were poor criteria 3.398 cases (33.58%). With delicate anamnesis, the poor photos could be used as additional information, and diagnosed for treatment plan. The acceptable photos actually gave clear picture, but it cannot be diagnosed perfectly. So that, the diagnosticable clinical intra oral photos were 45.37% while the 54.63% cannot be diagnosed, even though the photos were good. The most of radiograph was sent in teledentistry is panoramic (2.08%). Some patients did not consult their dental and oral health's problems, but have some question about more dental health's information in the website or e-commerce. The group of miscellaneous images was added, since there were photos of patient tooth due to avulsion, pus of abscess, bleeding, dental prosthetic, part of broken restoration and some picture to explain their case. Besides all the images, there were 9 videos sent by the patients.

4 DISCUSSION

The benefit of teledentistry is supporting to access dental care, especially during pandemic era. There were 1000 – 3000 consultations every month during the pandemic the Covid-19 was detected, especially in the high level infection throughout every country, in March until December 2020. The peak of consultation during pandemic era was in April 2020 with 3532 consultations, due to rule of physical distancing and limited the operational of dental practice. Air droplet in dental treatment is one of the media which spread Covid-19 contagious virus (Hervina *et al.* 2021; Yandi *et al.* 2002). People had a high-level awareness and positively took teledentistry for preventing the disease and increasing knowledge through dental health education. Teledentistry would improve a good solution for the preventing a longer time and treatments delays of dental care, because decreased the number of dentists practice during pandemic era (Aquilanti *et al.* 2020; Haider *et al.* 2020; Jha *et al.* 2021; Lin *et al.* 2020; Maqsood *et al.* 2021; Mehta & Mittai 2021; Soegyanto *et al.* 2002; Tenore *et al.* 2021). After the Covid-19 virus was controlled and dental care could be accessed directly, the total of consultation was decreased in June 2020, but the amount of consultation increased again during or after holiday in August and December 2020 (Aquilanti *et al.* 2020). It is assumed that during holiday, people stress for their dental health's problems and cannot go to dental care and treatment with their dentist directly so they choose more practical solution through teledentistry as early or preventive and emergency treatment.

Most of the patient were 50 years old or less. It seems that development of internet and mobile gadget has contributed to the character of patient (Sharma *et al.* 2021). Young adults, 21–30 years old, were the majority of the patients, with woman at the most. Women are supposed have more attention and awareness for their own or their family's dental health in comparison with men, besides women are more active than men, in social media (Soegyanto *et al.* 2002), although demographic data 2021 show the percentage of female population is 49.66% compare to 50.34% male population in Indonesia.

The concern of teledentistry is uncertainly for diagnostic accuracy because the inability to perform clinical examination such as palpation, percussion, thermal test, etc. Yet, it is mentioned that the accurate diagnosis is possible to do with visualization through digital photography, as patient do online consultation (Soegyanto *et al.* 2002). Unfortunately, the limitation of teledentistry is professional readiness by the dental photo's patient, a lack of clear and good resolution of intraoral imaging, IT connectivity, barrier for patients with low technology literacy (Estai *et al.* 2017; Lin *et al.* 2022; Mathews *et al.* 2015; Priambodo 2019). As shown in this study, most intra-oral photos are in poor dental and oral condition (3398 cases/ 33.48%). Some patient had difficulties in the good result of information's photo or there was limitation of the camera because they should have a good skill/ experience to take some picture (Modak & Basu 2020; Priambodo 2019). Some of the patients used a camera of smartphone which had low resolution which could not good result decent image (Modak & Basu 2020). Sometimes, the poor internet connection was also poor and corrupt in distributing the data (Estai *et al.* 2017; Modak & Basu 2020). The inability of providing good quality supporting for teledentistry makes the service is often challenging (Lin *et al.* 2020; Modak & Basu 2020). A good image of clinical intra oral photos can support some information for anamnesis, which lead to a perfect diagnosis of the case and the best of treatment planning for the patient (Chen *et al.* 2003). Even a good intra oral photo sometimes, unable to visualize the distal side of the last molar or immature plaque. Bad resolution of images sometimes resulted from a limitation of smartphone camera technology (Priambodo 2019). The high quality of image in teledentistry is a very important, especially for clinical image of the lesion and radiograph report. An error in technical photos such as wrong angle while taking the photo might lead into misdiagnosis (Kasuma *et al.* 2022). Actually, there are some tips and tricks in producing excellent intra oral image. Room lighting and built-in flash of the smartphone camera are suggested during the photography. A minimum of five dental images per patient should be taken, front, right lateral, left lateral, upper occlusal, and lower

occlusal views. These images are important, since photos can only provide a 2D-view, which prevents observing all tooth surfaces, particularly the interproximal surfaces of posterior teeth (molars) (Estai *et al.* 2017). The photographic have also limitations for the detection of caries on root surfaces unless they are exposed through gingival recession or nonvisible secondary caries (Eby *et al.* 2016; Estai *et al.* 2017). The 2D-view allows detection of carious lesions mostly on the occlusal surfaces, buccal and lingual surfaces of the teeth and sometimes fails to detect more than moderate caries (Estai *et al.* 2017). In some cases, the angle of photo is good, but saliva, blood, debris around the tooth and tongue, makes the photo difficult to analyze (Estai *et al.* 2017).

There are cases of inflammation which are difficult to diagnosed (Figure 4). Patient's main complains are inflammation with easily bleeding. This kind of complain can be interpreted as gangrene radix, pulp polyp, gingival polyp, pericoronitis and impacted wisdom tooth, periapical abscess or others (Figure 5). Therefore, intra oral photos is an important role in diagnosis and treatment planning (Gupta & Dalta 2019; Kasuma *et al.* 2022; Minervini *et al.* 2022; Priambodo *et al.* 2019).

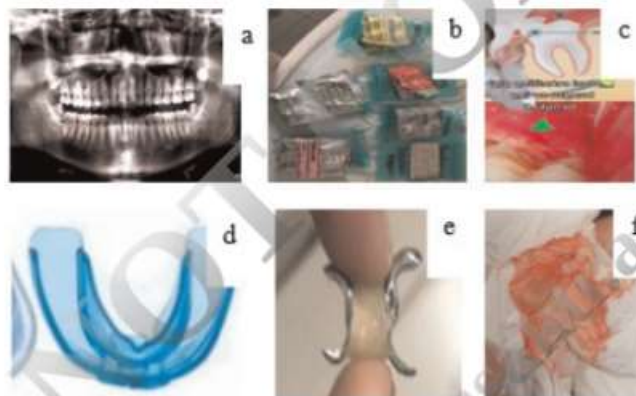


Figure 5. Other image; a. radiograph, b. medicine, c. ecommerce, d. dental material, e. dental education f. miscellaneous.

In some condition, intra oral photo cannot be result, such in of inflammation condition or temporomandibular joint disorders, patient cannot open his mouth (Minervini *et al.* 2022). Young patients such as infant or children under 2 years old with baby bottle caries syndrome, autism and syndrome down are the most challenging incooperative patient, that are not easily exposed (Deshpande *et al.* 2021).

There are some other images sent during teleconsultation, besides clinical intra oral or extra oral photos (Figure 5). There are radiographs, medicine images, the photos of dental education material, or even dental appliances such as mouthwash, teeth trainer, whitening, tooth brush, tooth paste and prosthetics. Radiograph is very useful in diagnostic and treatment planning (Deshpande *et al.* 2021). Extra oral, panoramic radiograph is the most radiograph sent, since it presents the whole condition of the teeth, besides periapical radiograph is limited during pandemic condition, especially pericoronitic and impacted teeth's case (Bhaskar *et al.* 2015; Gopi *et al.* 2019; Modak & Basu 2020; Sahni *et al.* 2021). The image of medicine taken can inform the dentist what kind of medicine should be prescribed to prevent drug interaction or double prescription and keep patient safety (Gopi *et al.* 2019; Modak & Basu 2020; Sahni *et al.* 2021). Some images of dental health education materials or

dental e-commerce confirms the utilization of internet and mobile-based health application in dental health education, awareness of oral hygiene, and very useful in promoting oral health, as mentioned before (Amtha *et al.* 2021; Aquilanti *et al.* 2020; Hervina *et al.* 2021; Kasuma *et al.* 2022).

A good detail anamnesis and a series of prime good images included intra oral photo and radiograph is very important and become the key success in teledentistry.

5 CONCLUSION

It can be concluded that teledentistry is useful for patient in the pandemic era. Unfortunately, the biggest problem is inadequate quality of digital intra-oral image that cannot be accurately diagnosed to support the anamnesis. A comprehensive anamnesis and image analysis during teledentistry is a very important to prevent complication of the cases in the future. In the complicated case, direct clinical consultation and treatment is suggested.

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Analyzing Teledentistry Consultation during The Pandemic Covid-19, A Challenge of Images in Online Consultation

by Rosalina Tjandrawinata FKG

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Analyzing Teledentistry Consultation during The Pandemic Covid-19, A Challenge of Images in Online Consultation

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ABSTRACT

Background:

Teledentistry is originally an online dental consultation using smartphone, or another gadget, which connect dentist and patient living in rural areas. However, during covid19 pandemic era, teledentistry become booming since it is relatively easy, simple, fast, practical and low cost, without meeting the dentist directly in the dental office. During teledentistry, the patient can get consultation, prescription for medicine, dental check-up, early or preventive treatment, emergency treatment, diagnosis of symptom, recommendation of treatment, education, and many more information about dental and oral health. In this consultation, dentist needs to anamnesis and examine the clinical situation through images, since some patients cannot explain their symptom clearly.

Objective:

Therefore, the objective of this study is analyzing the images in teledentistry during pandemic era 2019–2022.

Methods:

A total of 31,946 consultations through teledentistry were analyzed descriptively. Data and images were examined and were separated in some groups i.e: clinical intra oral photos, clinical extra oral photos, radiograph, medicine, dental education and non-categorized image.

Results:

The peak of consultation in the year 2020 was on April with 3532 cases. Most of the patients were 21 – 30 years old, with women at the most. Thirty two percent of patients sent images, while the rest did not send any images. Thirty three percent of the images were clinical intra oral photos that could be categorized as poor photos.

Conclusion:

Teledentistry is useful for patient in the pandemic era. The biggest problem is inadequate quality of digital clinical intra-oral photo that cannot be accurately diagnosis to support the anamnesis. A comprehensive anamnesis and image analysis during teledentistry is very important to prevent complication of the cases, in the future. In the complicated case, direct clinical consultation and treatment is suggested.

Keywords: covid19 pandemic era, image, teledentistry

BACKGROUND

Teledentistry is originally an online dental consultation using smartphone, or another gadget, which connect dentist and patient living in rural areas. However, during covid19 pandemic era, teledentistry become booming since it is relatively easy, simple, fast, practical and low cost, without meeting the dentist directly in the dental office, besides there was decreased number of dentists practice especially in the early months of pandemic era.¹⁻⁵ More than 90% of the patients feel very satisfied with the consultation, since they can communicate effectively with the dentist, without any unsecure feeling for potential contact with covid 19 and keep physical distancing.^{1, 3-13} During teledentistry, the patient can get consultation, prescription for medicine, dental check-up, early or preventive treatment, emergency treatment, diagnosis of symptom, recommendation of treatment, education, and many more information about dental and oral health.¹³⁻¹⁶ In this consultation, dentist needs to anamnesis and examine the clinical situation through images.¹⁷ In reality, many patients cannot explain their symptom clearly or they cannot make a good image to show their dental and oral health condition.^{16,18} Actually, any kind of camera can be used to make photograph of the tooth condition.¹⁶ For sure, intra oral camera is one of the best choices, used to make intra oral photograph for teledentistry.^{2,17} These situations make the dentist hard to analyze, which may impact to a wrong diagnosis or an inaccurate treatment.¹⁹ Therefore, the objective of this study is analyzing the images in teledentistry during pandemic era 2019–2022.

METHODS

A total of 31,946 consultations through teledentistry, using a platform mobile health application, were analyzed descriptively. Data and images during anamnesis were gathered, since patient was asked to take some pictures using smartphone camera to give more information about the case. The photos were separated in some groups i.e: clinical intra oral photos, clinical extra oral photos, radiograph, medicine, dental education and miscellaneous images.

RESULTS

The peak of consultation in the year 2020 was on April with 3532 cases, while in 2021 the peak was on January with 1035 cases and in 2022 there was 505 cases on May. Figure 1 represents the consultation during pandemic era, from October 2019 to June 2022. Most of the patients were 21 – 30 years old, with women at the most, and the oldest patient is 80 years old (Figure 2).

During anamnesis, patient was asked to take some picture using smartphone camera to give more information about the case. The images might in the form of clinical photos, intra oral or extra oral; radiograph, any kind of projection, intra oral or extra oral projection, such as periapical, occlusal, orthopantomograph / panoramic, cephalometry; the result of X-ray analysis; medicine or prescription; any kind of education material from websites or dental e-commerce. Hence, only thirty two percent (10,118 photos) of the patients sent photos, while the rest did not send any photo. These photos can be categorized in some groups, presented in Table 1. Clinical intra oral photos is the majority, 83.19%, categorized as good, acceptable, poor and impossible (Figure 3). The example of other images is presented in Figure 4. Most of intra oral clinical photos, were poor criteria 3.398 cases (33,58%). With delicate anamnesis, the poor photos could be used as additional information, and diagnosed for treatment plan. The acceptable photos actually gave clear picture, but it cannot be diagnosed perfectly. So that, the diagnosticable clinical intra oral photos were 45.37% while the 54.63% cannot be diagnosed, even though the photos were good. The most radiograph sent in teledentistry is panoramic (2.08%). Some patients did not consult his problems, but asked about health information in the website or e-commerce. The group of miscellaneous images was added, since there were photos of patient tooth due to avulsion, pus of abscess, bleeding, dental prosthetic, part of broken restoration and many others. Besides all the images, there were 9 videos sent by the patients.

DISCUSSION

The benefit of teledentistry is supporting access to dental care, especially during pandemic era.³ There were 1.000 to 3.000 consultations every month when the Covid-19 was detected, especially in high level infection throughout the countries, in March to December 2020. The peak of consultation during pandemic era was in April 2020 with 3.532 consultations, due to rule of physical distancing and limited operation of dental practice. Air droplet during dental

treatment is one of the media which spread Covid-19 contagious virus.^{12,14} People had a high-level awareness and positively took teledentistry for preventing the disease and increasing knowledge through dental health education. Teledentistry would improve a good solution for the preventing longer time and treatments delays of dental care, because decreased number of dentists practice during pandemic era.³⁻¹¹ After the Covid 19 was controlled and dental care could be accessed directly, the total of consultation was decreased in June 2020, but the amount of consultation increase again during or after holiday in August 2020 and December 2020.⁷ It is assumed that during holiday, people does not want to come to clinic or doctors and choose more practical solution through teledentistry.

Most of the patient were 50 years old or less. It seems that development of internet and mobile gadget has contributed to the character of patient.²⁰ Young adults, 21-30 years old, were the majority of the patients, with woman at the most. Women are supposed have more attention to their own or their family's health in comparison with men, besides women are more active than men, in social media,⁴ although demographic data 2021 show the percentage of female population is 49.66% compare to 50.34% male population in Indonesia.

The concern of teledentistry is uncertainly for diagnostic accuracy because the inability to perform clinical examination such as palpation, percussion, thermal test, etc. Yet, it is mentioned that the accurate diagnosis is possible to do with visualization through digital photography, as patient do online consultation.⁴ Unfortunately, the limitation of teledentistry is professional readiness, low technology literacy, a lack of clear and good resolution of intraoral imaging, IT connectivity, barrier for patients with low technology literacy^{3,16,21,22} As shown in this study, most intra-oral photos are in poor condition (3.398 cases / 33,48%). Some patient had difficulties in producing a clear informative photo or there was limitation of the camera.^{16,18} Some of the patients used smart phone camera which had low resolution which could not produce decent image.¹⁸ Sometimes, internet connection was also poor and corrupt in distributing the data.^{18,21} The inability of providing good quality support for teledentistry makes the service is often challenging.^{3,18} A good image of clinical intra oral photos can support some information for anamnesis, which lead to a perfect diagnosis of the case and best treatment for the patient.²³ Even a good intra oral photo, sometimes, unable to visualize the distal side of the last molar or immature plaque. Bad resolution of images sometimes resulted from a limitation of smartphone

camera technology.¹⁶High quality of image in teledentistry is very important, especially for clinical image of lesion and radiograph report. An error in technical photos such as wrong angle while taking the photo might lead into misdiagnosis.²⁴Actually, there are some tips and tricks in producing excellent intra oral image. Room lighting and built-in flash of the smartphone camera are suggested during the photography. A minimum of five dental images per patient should be taken, front, right lateral, left lateral, upper occlusal, and lower occlusal views. These images are important, since photos can only provide a 2D-view, which prevents observing all tooth surfaces, particularly the interproximal surfaces of posterior teeth (molars).²¹ The photographic have also limitations for the detection of caries on root surfaces unless they are exposed through gingival recession or nonvisible secondary caries.^{15,21} The 2D-view allows detection of carious lesions mostly on the occlusal surfaces, buccal and lingual surfaces of the teeth and sometimes fails to detect more than moderate caries.²¹In some cases, the angle of photo is good, but saliva, blood, debris around the tooth and tongue, makes the photo difficult to analyze.²¹

There are cases of inflammation which are difficult to diagnosed (Figure 4). Patient's main complains are inflammation with easily bleeding. This kind of complain can be interpreted as gangrene radix, pulp polyp, gingival polyp, pericoronitis and impacted wisdom tooth, periapical abscess or others (Figure 5). Therefore, intra oral photos play an important role in diagnosis and treatment planning.^{16,24,25,26}

In some condition, intra oral photo cannot be produced, such in of inflammation condition or temporomandibular joint disorders, patient cannot open his mouth.²⁶ Young patients such as infant or children under 2 years old with baby bottle caries syndrome are the most challenging patient, that are not easily exposed.²⁷

There are some other images sent during teleconsultation, besides clinical intra oral or extra oral photos (Figure 4). There are radiographs, medicine images, photos of dental education material, or even dental appliances such as teeth trainer and prosthetics. Radiograph is very useful in diagnostic and treatment planning.²⁷ Extra oral panoramic radiograph is the most radiograph sent, since it presents the whole condition of the teeth, besides periapical radiograph is limited during pandemic condition.^{18,28,29,30}The image of medicine taken can inform the dentist what kind of medicine should be prescribed to prevent drug interaction or double prescription and keep patient safety.^{18,28,29}Some images of dental health education materials or dental e-

commerce confirms the utilization of internet and mobile-based health application in dental health education, awareness of oral hygiene, and very useful in promoting oral health, as mentioned before.^{1,7,14,24}

A good detail anamnesis and a series of prime clear images included intra oral photo and radiograph is very important and become the key success in teledentistry.

CONCLUSION

It can be concluded that teledentistry is useful for patient in the pandemic era. Unfortunately, the biggest problem is inadequate quality of digital intra-oral image that cannot be accurately diagnosed to support the anamnesis. A comprehensive anamnesis and image analysis during teledentistry is very important to prevent complication of the cases, in the future. In the complicated case, direct clinical consultation and treatment is suggested.

5 CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this study.

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TABLE

Table 1. Digital images sent during teledentistry communication

Category of image	Criteria	Total	%
1. Intra oral clinical condition	a. Clear: Very good and clear image, can be easily diagnosed	1,193	11.79
	b. Acceptable: Acceptably good image, can be diagnosed	1,800	17.79
	c. Poor: Bad image, hard to diagnose	3,398	33.58
	d. Impossible: Bad image, cannot be analyzed	2,027	20.03
2. Extra oral clinical condition		386	3.81
3. Radiograph	a. Periapical	36	0.36
	b. Panoramic	210	2.08
	c. Cephalometry	12	0.12
	d. Occlusal	1	0.01
	e. X-Ray analysis	2	0.02
4. Medicine	a. Taken medicine	650	6.42
	b. Prescription	32	0.32
5. Dental Education	a. Promotion material / e-commerce	27	0.27
	b. Article from internet	35	0.35
6. Miscellaneous		382	3.78
7. Video		9	0.09
Total of The Images		10,118	100%

FIGURES

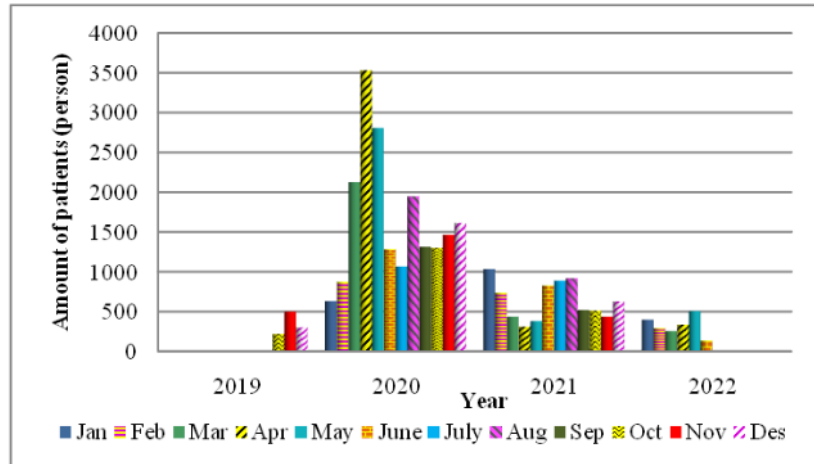


Figure 1. Total consultation during pandemic era, from October 2019 to June 2022.
The peak is on April 2020

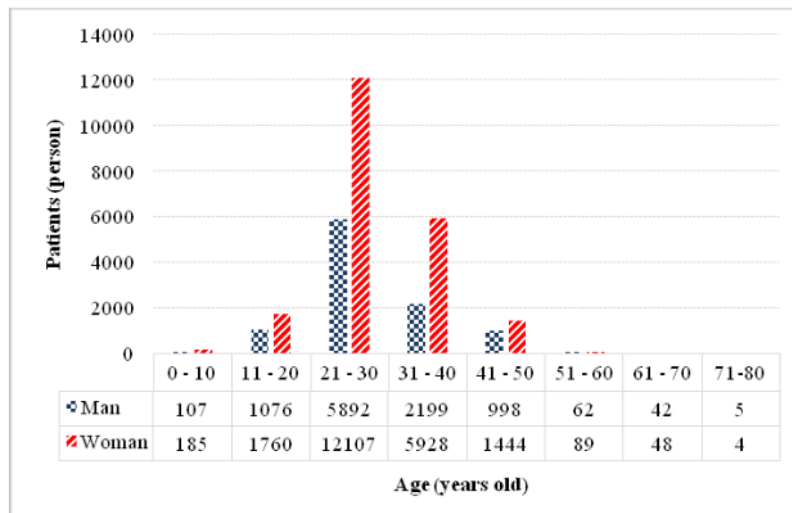


Figure 2. Distribution of man and woman patient from October 2019 to June 2022.
The peak is woman at the age of 21 – 30 years old

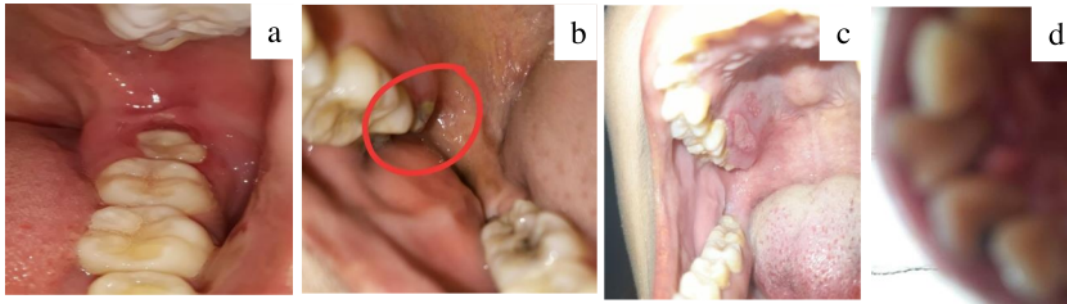


Figure 3. Four categories of intra-oral photos in teledentistry from good, acceptable, poor and impossible photos

- a. Clear photo of tooth #38 diagnosed as pericoronitis
- b. Acceptable photo of tooth #18 cannot be diagnosed as impacted tooth or necrotic pulp
- c. Poor photo of tooth #48, major tooth was unseen, but can be diagnosed as impacted
- d. Impossible photo, bad image of anterior teeth, blurred and cannot be analysed.

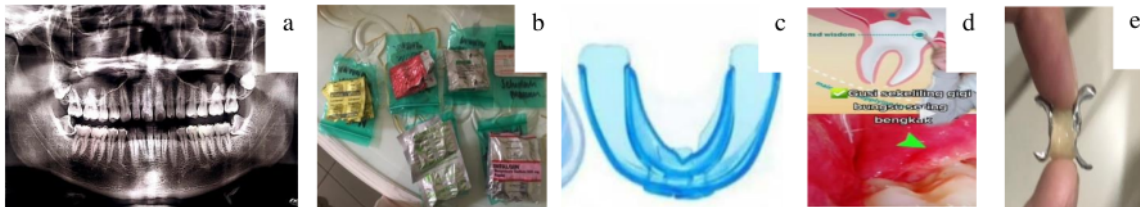


Figure 4. Other images during teleconsultation, besides clinical intra oral or extra oral photos. a. radiograph, b. medicine, c. e-commerce, d. dental education material, e. miscellaneous

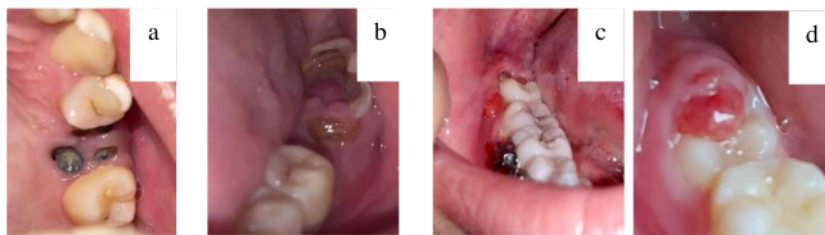


Figure 5. Examples photos from patient with inflammation symptoms. Similar complain may result in different diagnosis and treatment plan. a. gangrene radix, b. gingival polyp of second molar confused with pericoronitis of impacted wisdom tooth, c. periapical abscess of second molar confused with pericoronitis of impacted wisdom tooth, d. pulpal polyp confused with pericoronitis

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